

## **SIMULATING THE INVESTMENT SELECTION PROCESS IN AN EMPLOYER-SPONSORED PLAN: A SIMPLE ACTIVITY FOR AN INTRODUCTORY PERSONAL FINANCE COURSE**

**Chris Brune, Ouachita Baptist University**

**Dana Dixon, Ouachita Baptist University**

### **Abstract**

An undergraduate Personal Finance class typically includes a discussion of investments and the importance of asset allocation. However, in order to make future decisions about their employer-sponsored retirement plans, students also need exposure to the process of building a portfolio from a list of pre-determined investment options. This paper introduces an activity that successfully blends an overview of key mutual fund selection criteria with a discussion of how those same funds can be combined to form a portfolio.

### **Introduction**

Study after study reveals the same uncomfortable truth: Americans aren't saving enough – if at all – for retirement. And the numbers are alarming. According to 2020 Census data, fewer than half of all working-age Americans have any retirement savings. Worse still, even among those aged 55-64, 42% do not have a single retirement account.

One issue involves access to employer-sponsored plans. A 2022 study by the AARP reported that 57 million Americans in the private sector do not have access to a retirement plan at work. This is particularly troubling given the popularity of employer-sponsored plans for those who do save.

However, even employees who have the option to save may not have access to the help they need. The Employee Retirement Income Security Act of 1974 (ERISA) limits the advice that can be provided by external advisors; human resources managers are often ill-equipped to answer investments-related questions; and many plan administrators simply do not have time to provide ongoing personalized advice to every employee. Even the employee who has the option to save and chooses to do so can become intimidated and frustrated when trying to select from a menu of investment options.

Target date, or life-cycle funds offer one solution for the employee who is looking for ongoing management without advanced investment knowledge. The employee simply selects the portfolio that most closely mirrors an intended retirement date and the investment manager takes care of the rest. However, there are also disadvantages of target date funds, most notably that they do not account for individual risk tolerance.

Furthermore, not every retirement plan provider includes target date funds in their menu of options.

As a result, there is a need for the average employee to understand some basics about asset allocation and security selection, particularly as it relates to retirement accounts. The classic study from Brinson et al. (1982) reveals that as much as 93% of portfolio variability comes from asset allocation. While challenges to their seminal work have arisen over time, the importance of asset allocation in portfolio management remains unchallenged. And if asset allocation is important, then it follows that the ability to match investment options to a desired allocation is also important.

A typical undergraduate Personal Finance course often includes a discussion of asset allocation as part of a broader conversation on investing. This is a good first step. Financial literacy can help future employees gain a better understanding of investments and the basics of retirement plans and portfolio theory. However, without some form of active learning, the effectiveness of the content in ultimately driving action is limited. It is in the application of the process that students gain confidence in their decision-making. This paper introduces a simple activity that helps simulate the process of devising an allocation and implementing it with a menu of mutual funds as investment options.

### **Literature Review**

Active learning is defined by Bonwell and Eison (1991, p. 2) as “anything that involves students in doing things and thinking about the things they are doing”. Active learning evolved from constructivist learning theory which asserts that students construct new knowledge upon the foundation of their prior knowledge and experiences (Bransford et al., 1999). There are many different active learning strategies. Some examples are think-pair-share, simulations, concept map, case studies, games, and cooperative learning. Active learning forces students to become active participants instead of passive recipients. Becoming a participant helps students learn to analyze, synthesize, and evaluate the ideas they are being taught (Felder & Brent, 2016). It also helps students understand their own attitudes and values. When students participate in learning and then reflect on the activity, they retain more of what they learn (Felder & Brent, 2016).

Several different studies have used active learning to teach students about investing in mutual funds. Weinstein and Bloom (1998) use a case study based on the investment and sale of shares of mutual funds to teach students tax planning for individuals. The case focuses on using advance tax planning during the purchase and sale of mutual fund shares to reduce the tax burden of the individual tax payer. Macy (2001) created an extended lesson plan that contains several different requirements. Students are given several different scenarios and are required to calculate mutual fund returns. This helps students learn that an investor’s return is affected by mutual fund loads and taxes. Students are also required to make sure the mutual fund aligns with the investor’s goals. The last requirement is for students to design their own mutual fund which illustrates the need to diversify.

Dukes and Macy (2003) developed a case study that requires students to assess the advantages and disadvantages of mutual funds that are options for a 401(k) plan. The

students must structure a portfolio for a client based on the available mutual funds and the client's goals and risk tolerance. Students must also factor in the age of the client and the annual expense ratio of each fund. The activity presented in the present paper is similar in many ways, but also incorporates additional discussion of subjective risk tolerance while introducing an alternate approach.

Porter (2013) developed a stock market simulation game to teach students to invest without putting any cash at stake. Porter (2013) includes faith-based investing in his teaching about the stock market and requires students to keep a certain percentage of their portfolio in stock of companies that are faith-based and socially responsible. Porter (2013) recommends a class discussion of the philosophies of management and the screening criteria of mutual funds that pursue a faith-based and socially responsible strategy.

The active learning strategy in the present paper is cooperative learning which places students in groups and requires them to solve a problem. This activity encourages students to apply the knowledge they have gained from lectures and to practice interpersonal skills while solving real-world problems in a group setting (Prince, 2004). Discussing a case-based scenario in a group introduces students to multiple viewpoints, encourages discussion and helps students understand the solution and the process (Kathiresan & Patro, 2013).

Understanding the process of choosing investments for a retirement plan is an important skill for students to learn. In the 1980's, most retirement savings were accumulated in defined benefit plans where the responsibility for managing the plan's investments fell to the employer. Over the years, most employers have transitioned to defined contribution plans. According to Clark et al. (2014), almost 90 percent of current retirement contributions are being invested in defined contribution plans. Many of the defined contribution plans require participants to actively manage their investments by choosing how their contributions will be allocated between the investment options provided by the employer. This presents a problem which the Securities & Exchange Commission (SEC) pointed out in a study prepared in 2012. The study found that basic concepts such as diversification and investment costs are not understood by many investors (SEC, Staff Study, 2012).

Another problem that has been noted in research is that plan participants may use "naïve diversification" where they allocate their money into all the choices made available by their plan (Tang et al., 2010). This type of diversification blindly allocates money to investments that aren't suitable for some investor's risk tolerance. Also, money may be allocated to investments that aren't actually attractive. To help students avoid the errors mentioned above, this activity provides an introduction to basic investment allocation.

### **Presenting the Activity**

To simulate the allocation process in a defined contribution plan, an activity should combine the evaluation of individual investments with some type of portfolio construction. The activity presented below begins with an analysis of twelve mutual funds. Next, a discussion of asset allocation helps students evaluate their personal risk

tolerance relative to their peers and one or more model portfolios. Finally, the two components are integrated as funds are mapped to the desired allocation.

The activity has been used in an introductory Personal Finance course at a small private university for the past ten years. Enrollment ranges from 30 to 90 students depending on the number of sections offered. The course is taught at the sophomore level, is an option in the university core curriculum, and is therefore taken by both business and non-business majors. Some students enter the course with basic financial knowledge; many enter without any.

Three class periods are devoted to instruction on investments. The first begins with a discussion of fundamental investing principles and an overview of stocks and bonds. The second is devoted to mutual funds, and the third to diversification and asset allocation. Before each exam, a case is used as an in-class exercise to help students review and apply the related material. The activity described in this paper is part of the case that immediately precedes an exam on insurance and investments. The class time allocated to the activity is approximately 30-45 minutes.

### **Evaluate Mutual Funds**

To begin, the instructor asks class members to review information on the twelve mutual funds listed in Tables 1 and 2. Each fund represents a different asset class. The data presented in the tables were collected from Morningstar.com on July 7, 2023. All performance numbers are for the period ending June 30, 2023.

The first table provides basic descriptive information. Fund category, size, inception date, manager tenure, expense ratio, and Morningstar rating all help shape an initial impression of the funds in the menu. Depending on the depth of coverage leading up to the activity, the instructor may either move quickly through these variables or slow down and reinforce the importance of each. Additionally, because this is a limited list of data points, and many others might be considered by someone planning to invest, the instructor may choose to add or delete one or more criteria to the list. When presented previously, instructors have chosen to simplify the activity by narrowing the list of criteria and placing a greater emphasis on a select few.

A listing of twelve mutual funds representing twelve distinct asset classes and descriptive variables that can be used to aid in the selection process. Fund Name – formal name of the mutual fund. Ticker Symbol – unique identifier assigned to the fund. Morningstar Category – asset class assigned by Morningstar. R2 – a statistical measure that explains how closely fund performance mirrors the assigned category. This is particularly important for investments that are intended to represent a particular asset class within a broader allocation. Total Assets – Total Assets of Fund including cash and liabilities (Morningstar definition). Inception Date – date the fund began operations. Number of Managers – number of individuals currently part of fund management team. Average Manager Tenure – mean tenure of current managers. Morningstar Rating – Morningstar’s proprietary rating system assigns a score of one to five stars, with five being highest. Expense Ratio – annual percentage deducted from fund performance to cover operating expenses. Data for VMFXX was unavailable on Morningstar and was collected directly from the fund fact sheet.

**Table 1: Mutual Fund Summary Statistics**

Fund Name	Ticker Symbol	Morningstar Category	R <sup>2</sup>	Total Assets	Inception Date	Number of Managers	Average Manager Tenure	Morningstar Rating	Expense Ratio
Vanguard Federal Money Market Fund	VMFXX	NA	NA	238.6 B	7/13/1981	NA	NA	NA	0.11%
Fidelity Intermediate Term Bond Fund	FTHRXX	Intermediate Corporate Bond	88.90	2.7 B	5/23/1975	3	7.8 yrs	*****	0.45%
Invesco Corporate Bond Fund	ACCBX	Corporate Bond	64.88	2.7 B	9/23/1971	5	8.1 yrs	****	0.77%
Vanguard High-Yield Corporate Bond Fund	VWEHX	High Yield Bond	25.96	22.7 B	12/27/1978	3	5.8 yrs	****	0.23%
Vanguard 500 Index Investor Fund	VFINX	Large Blend	100	325.5 B	8/31/1976	2	6.5 yrs	****	0.14%
Growth Fund of America	AGTHX	Large Growth	90.60	231.9 B	11/30/1973	13	11.5 yrs	***	0.60%
Fidelity Mid-Cap Stock	FMCSX	Mid-Cap Blend	81.75	7.5 B	3/29/1994	1	6 yrs	*****	0.85%
Fidelity Small Cap Index	FSSNX	Small Blend	75.17	21.2 B	9/8/2011	5	7.5 yrs	***	0.03%
Vanguard Total International Stock Index Admiral	VTIAX	Foreign Large Blend	98.57	56.9 B	11/29/2010	2	10.3 yrs	***	0.11%
Dodge & Cox Global Stock I	DODWX	Global Large-Stock Value	85.64	9.9 B	5/1/2008	6	11.4 yrs	****	0.62%
American Funds New World A	NEWFX	Diversified Emerging Markets	91.87	51.7 B	6/17/1999	12	10.2 yrs	*****	0.96%
DFA Real Estate Securities I	DFREX	Real Estate	47.99	7.6 B	1/5/1993	2	4.8 yrs	****	0.18%

The second table provides a variety of performance metrics, including measures of both return and risk. Average annual returns are provided for one, three, five, ten, and fifteen-year time horizons, with corresponding category percentile ranks for each. Risk-return measures include standard deviation and the Sharpe ratio. Effective duration is also included as an option for instructors who choose to spend more time on fixed income alternatives.

**Table 2: Mutual Fund Performance Measures**

Ticker Symbol	1-Year Return	% Rank in Category	3-Year Return	% Rank in Category	5-Year Return	% Rank in Category	10-Year Return	% Rank in Category	15-Year Return	% Rank in Category	Standard Deviation (10-year)	Effective Duration (current)	Sharpe Ratio (10-year)
VMFXX	2.66	NA	0.92	NA	1.34	NA	0.82	NA	NA	NA	NA	NA	NA
FTHRXX	0.17	10	-2.19	6	1.35	58	1.57	57	2.85	51	3.20	3.80 yrs	0.17
ACCBX	1.42	58	-2.72	25	1.8	37	2.98	6	4.39	23	6.76	7.20 yrs	0.31
VWEHX	8.40	48	2.35	68	3.31	27	4.13	21	5.70	29	6.78	3.82 yrs	0.48
VFINX	19.42	28	14.44	31	12.15	22	12.71	15	10.74	18	14.93	NA	0.81
AGTHX	22.33	56	9.43	61	9.85	77	12.63	62	9.97	72	16.16	NA	0.46
FMCSX	12.33	69	17.31	7	9.66	14	10.75	13	9.22	43	16.00	NA	0.65
FSSNX	12.56	53	10.89	84	4.31	72	8.42	52	NA	NA	19.57	NA	0.46
VTIAX	12.31	82	7.51	62	3.69	56	5.05	56	3.05	58	15.03	NA	0.33
DODWX	13.22	55	17.25	10	8.42	13	9.23	6	7.64	12	17.71	NA	0.53
NEWFX	14.22	9	5.53	30	5.52	5	5.91	2	4.19	5	14.80	NA	0.39
DFREX	-4.44	70	6.12	66	5.04	29	6.73	21	7.06	28	16.99	NA	0.41

Performance measures for the twelve funds in the menu, with emphasis on risk and return data points. 1-Year, 3-Year, 5-Year, 10-Year, 15-Year Returns –trailing period returns as-of June 30, 2023. % Rank in Category – percentage ranking within assigned Morningstar category as based on performance during corresponding time period and as-of June 30, 2023. Standard Deviation (10-year) – average annual deviation from mean return based on prior ten years of data. Effective Duration (current) - measure of the sensitivity of bond prices to small changes in yield. Sharpe Ratio (10-year) – a risk-adjusted measure developed by Nobel Laureate William Sharpe. It is calculated by using standard deviation and excess return to determine reward per unit of risk. The higher the Sharpe Ratio, the better the fund’s historical risk-adjusted performance. The Sharpe ratio is calculated for the past 36-month period by dividing a fund’s excess returns by the standard deviation of a fund’s excess returns. Since this ratio uses standard deviation as its risk measure, it is most appropriately applied when analyzing a fund that is an investor’s sole holding. The Sharpe Ratio can be used to compare two funds directly on how much risk a fund had to bear to earn excess return over the risk-free rate (Morningstar definition). Data for VMFXX was unavailable on Morningstar and was collected directly from the fund fact sheet.

Students are provided a list of questions to help with their analysis, and are given time to answer the questions individually or in groups of two or three. The instructor may choose to walk around the room and provide assistance before ultimately calling time and discussing answers with the entire class. Each instructor will likely choose to add or remove questions depending on areas of emphasis, but a sample list might include the following ten to initiate the conversation. Commentary on each question is included to provide sample talking points for use in class discussion.

1. **Which is the most important to consider, the 1, 3, 5, 10 or 15-year return?** The purpose here is to point out that knowing returns across multiple time periods can be helpful. While longer-term performance may be more representative of expected future results, it is also good to see how the fund has performed recently. Additionally, a 15-year average may not be as significant for a fund that has recently experienced turnover in the management team.
2. **Which fund has provided the highest 15-year gross return?** A straightforward question that can be used to stress the value of longer-term performance. The instructor may also use the question as a launching point for a broader discussion of mean average returns for various asset classes over time.
3. **Which fund charges the most in annual expenses?** An important reminder of the importance of fees and expenses when evaluating returns.
4. **Which fund has provided the highest 15-year net (expense-adjusted) return?** Allows the student to synthesize return and fee data in evaluating net returns.
5. **Which fund would likely be considered the most risky?** Standard deviation is the most pure measure of risk included in Table 2, so the most direct answer is the fund with the highest standard deviation (FSSNX). However, this question can also lead to a comparison of risk among different asset classes, as well the concept of risk-adjusted return.

6. **Which fund has provided the best 10-year risk-adjusted return?** A follow-up to question five invites students to use the Sharpe ratio to evaluate the funds more closely.
7. **Which fund most closely mirrors its' benchmark?** This question highlights the fact that some funds are more representative of their categories than others. This is an especially important concept for a portfolio that is constructed with a top-down approach.
8. **Which fund would be the best investment vehicle for a goal of saving for a down payment on a house in two years?** The answer is somewhat subjective, and the answer depends on a variety of factors including investor risk tolerance, etc. The goal of this question is to stimulate a conversation about goals, risk, expected return, and time horizon.
9. **Which fund would be most appropriate investment vehicle for building a cash reserve?** Again, the purpose of these more subjective questions is to initiate conversation, although it might be difficult to argue for anything other than the money market fund.
10. **Which fund would be appropriate for an investor who wants to simplify his retirement savings by investing all monthly contributions into a single fund and would like to maintain broad market exposure while minimizing expenses?** The best answer is the S&P 500 Index Fund, although other options would be appropriate with question modifications.

### Select Asset Allocation

Once the class has reviewed the funds, the discussion turns to asset allocation. Students are told to assume they have recently started a new job and their new employer offers a retirement plan with a variety of investment options. Their objective is to construct a portfolio using the funds described in Tables 1 and 2. The only restriction is that their portfolio weights sum to one. Students may elect to invest 100% in a single fund, an equal amount in each fund, or any other combination they choose.

Without any prior experience, many struggle to arrive at an allocation with any degree of confidence. To aid the learning process, a three-step approach is used. Each student is first asked to determine what they would do if required to make the decision on their own. After all students determine their individual allocations, they are asked to form groups of three or four and compare notes. They are also asked to form a group allocation using whatever method they choose to aggregate their individual preferences. As a third step, the group allocations are written on a whiteboard by the instructor for further discussion. (Simply write the fund names in a column similar to the one shown in Table 3 and then record the results of each group in a separate column.) Results tend to vary greatly.

For the class discussion, it is helpful to first identify the highest and lowest weightings to each primary asset category (money market, bonds, stocks, and real estate). Once the outliers are identified, the outlying groups are asked to explain their rationale. Answers provide multiple entry points for further discussion. Conversations surrounding risk

tolerance, time horizon, and diversification occur very naturally as students compare their individual and group allocations to those of their classmates.

**Table 3: Asset Allocation**

Fund Name	Ticker Symbol	Morningstar Category	Allocation Percentage
Vanguard Federal Money Market Fund	VMFXX	Money Market	
Fidelity Intermediate Term Bond Fund	FTHRX	Intermediate Corporate Bond	
Invesco Corporate Bond Fund	ACCBX	Corporate Bond	
Vanguard High-Yield Corporate Bond Fund	VWEHX	High Yield Bond	
Vanguard 500 Index Investor Fund	VFINX	Large Blend	
Growth Fund of America	AGTHX	Large Growth	
Fidelity Mid-Cap Stock	FMCSX	Mid-Cap Blend	
Fidelity Small Cap Index	FSSNX	Small Blend	
Vanguard Total International Stock Index Admiral	VTIAX	Foreign Large Blend	
Dodge & Cox Global Stock I	DODWX	Global Large-Stock Value	
American Funds New World A	NEWFX	Diversified Emerging Markets	
DFA Real Estate Securities I	DFREX	Real Estate	
<b>TOTAL</b>			<b>100%</b>

As a final step, it is also helpful to compare class outcomes to a more scientific result. Admittedly, the exercise is designed to generate discussion and deeper thinking about the subjects without proposing a formal mean-variance derived portfolio. For a more accurate prescription, it is necessary to introduce a risk questionnaire or similar tool that can measure risk with more precision. There are numerous examples on financial websites that can be accessed for free, although some are much more robust than others. The instructor may also share personal insight or advice about the initial allocation decision.

### **Pedagogical Challenges and Benefits**

While student responses to the allocation question will naturally vary from year to year and class to class, certain trends have emerged that remain constant. Some represent challenges to the successful presentation of the activity; others represent encouraging evidence of student learning.



## **Challenges**

Perhaps the greatest challenge in a discussion of investments with freshmen and sophomores is the disparity in financial literacy among the students. Some of the difference may reflect the difference in natural interest and major, especially when the course attracts majors from across campus. Some is surely evidence of vastly different levels of exposure to financial matters in the home. But regardless of the cause, the result is a very broad mix of opinions and understanding of investments. Given the typical content in an introductory Personal Finance course, there is limited time to delve deeply into security analysis or portfolio management. As a result, the instructor may be forced to focus on foundational principles and simplify the investment process. We believe the activity described in the present paper provides one solution for accomplishing this objective while acknowledging the limitations of a simplified approach.

Another key challenge arises from the economic cycle. Because the data are limited to fifteen years of historical returns, performance numbers may be skewed by recent market results. A significant market decline may cause equities to show a lower average return than fixed income or even cash during some time periods. While it is valuable for students to understand the dynamics of markets, it is also helpful for them to learn about long-term expectations for returns on various asset classes. Reporting actual results may give a false impression about long-run returns – in both bad and good markets. The instructor will need to be sure to address recent market performance and compare it to historical norms.

A third trend represents a challenge that has been a surprise to the authors. Students in the past decade have tended to be very conservative in their allocations. Perhaps this should not be a surprise on the heels of the financial crisis in 2008-2009, particularly for students who have heard parents discuss losses on investments during that time. But the surprising part is that students who allocate at least 50% to the money market fund do not cite the risk of losing money in the short run. Instead, they point to the need to not take risk with their retirement funds. Perhaps that would be a wise strategy for someone approaching retirement, but for a 20-year-old with 50 years until retirement, it reflects a lack of understanding of risk and compound interest.

## **Benefits**

Consequently, a primary benefit of the exercise is that it forces students to wrestle with their personal tolerance for risk. When they see the class allocations between risky and less risky alternatives, there is an opportunity for a moment of self-discovery. At a minimum, they realize they are more risk averse than their peers. Beyond that, some learn that accepting some risk in planning for retirement is appropriate.

A related benefit occurs as they discuss their personal allocation in their group and are required to explain their rationale. Some quickly acknowledge that they did not have a good rationale for their allocation and are open to alternatives. Through the process, our hope is that they are either inspired to study and learn more about investments on their own, or recognize their need to hire someone to help them with their decisions down the road.

But perhaps the greatest benefit occurs as students begin to put the things they have learned into action. While the evidence is all anecdotal, and the sample size is small, it is not uncommon for a student to approach an instructor after the activity to inquire about investing some summer money or reallocating some portion of a savings account to pursue additional returns. The dollar amounts are usually small, and most of the situations are fairly straightforward, but they typically represent an increased desire to implement the things they have learned in the management of their own investments.

### **Conclusion**

There is little debate about the need for greater financial literacy, particularly when it comes to retirement planning. While the majority of today's students will have the opportunity to participate in an employer-sponsored plan, few are prepared to make proper allocation decisions. The activity introduced in this paper is designed to help close that gap. First, students are led to evaluate a menu of mutual fund options based on a list of selection criteria. Second, they are asked to develop a personal investment allocation, and then compare it to those developed by their peers. Our hope is that the additional insight gained through this simple active learning tool will help accelerate their confidence in managing their retirement portfolios in the future.

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